Time.	*Pulse.*	*Respiration.*	*Temperature by the month.*
3.13 P.M.	77	18	99¼
3.20 "	72	20	99¼
3.27 "	70	18	99
3.44 "	65	19	99¼
3.58 "	68	18	99¼
4.12 "	retching, vomiting, prostration, headache, and slight disposition to sleep.		

As in the lower animals, it at first increases the respiratory action and temperature. It also reduces the heart beat, which subsequently exceeds the normal, and then recedes it nine beats below the normal.

Like lobelia, it gives rise to nausea, emesis, prostration, dilatation of pupils, with disposition to sleep. Of course large doses would have a different effect.

This experiment demonstrates that the active principle of Lobelia inflata is lobelina, and that probably it is the only active principle.

ART. V.—MITRAL STENOSIS; CEREBRAL EMBOLISM; LEFT HEMIPLEGIA, CEREBRAL SOFTENING, DEATH.

BY M. A. WILSON, M. D., NEW YORK.

[*Read October 27th, 1876, Before the Neurological Society, N. Y.*]

MEDICAL literature is rapidly becoming replete with cases which may be included under the above heading, and the subjects of "Embolism" and "Thrombosis" are ones with which the profession are much more familar at the present time, than even but a very few years ago.

It is within the recollection of the majority of physicia[ns] when all cases of sudden or unexpected death, were consid[ered] as due to "heart disease" or "apoplexy" alone; cerebral

pulmonary emboli, thrombosis, heart-clot, etc., never being mentioned nor probably suspected.

With the object of increasing the number of recorded similar cases, and assisting what little it may in the symptomatology and treatment, I report the following case, written in my note-book in 1874–'5. It is also mentioned in the last edition of Dr. Hammond's work on nervous diseases, page 130.

The patient being a near relative, I felt (as most physicians do) some little embarrassment in treating her exclusively myself, and therefore asked the counsel and assistance of several most eminent practitioners in the city.

Miss V. B. W., aged 20, naturally strong and healthy, inheriting no affections whatever. Eleven years ago (1863), she had a very severe attack of acute articular rheumatism, and five years ago (1869), one of acute pleurisy, right side, with slight effusion, since which time *there has been no return* of either affection.

No symptoms referable to cardiac disease appeared until early in 1872, nearly three years after, nine years after the rheumatism, during all of which time her health was exceedingly good.

Since that date (1872), she suffered occasionally from dyspnœa, cough, difficulty in walking at all fast, especially in wintry weather, or in ascending stairways; also within the past year, she has frequently, after retiring, been awakened from a sound sleep, owing to severe dyspnœa, pain, etc., and for an hour or two following, she would not be able to again assume the recumbent position.

Previous to December, 1873, she was not a resident of this city, and was only treated from that date until February 22d, 1875, the date of her death.

The heart's impulse was strong, well-marked, the organ somewhat hypertrophied.

A loud, pre-systolic murmur could be distinctly heard at the apex, indicating mitral obstruction—mitral stenosis—as, also, an aortic murmur, considered as being due to anæmia.

While in the country during summer of 1874, these attacks of dyspnœa were frequent, but became *very* much less so when

she returned to the city in September; her general health at this time was excellent; pulse 80, appetite good, felt and slept well, menstruation and bowels regular.

The treatment, previous to time of the occurrence of cerebral embolism, consisted of the various preparations of iron, "chemical food" (earthy phosphates) quinine, strychnia, sherry, porter; in brief, tonics and nourishing food in general, out-door exercise, etc., and with the best of results as just above mentioned; the cardiac difficulty was also much improved, as evidenced by the entire absence of palpitation, dyspnœa, pain and cough.

On Wednesday, Sept. 29th, 1874, she complained of headache, seemed much depressed, and remarked that she felt badly. The weather being fine, she called about 3 P. M. upon a lady acquaintance in the upper portion of the city, reaching her residence by street cars. This friend living on the fourth floor of a "French flat," our patient (her first visit there) ascended in an elevator on the wrong side of the house, so had to walk through to the other side and down one flight of stairs to her friend's apartments, when, just as she had reached the door, she suddenly, without further premonition, whatever, fell to the floor, not however losing consciousness.

This was followed almost immediately by a *very* severe, dull, heavy pain in the *right* temporal region, accompanied with vertigo but no nausea or vomiting; this pain, I will state *en passant*, did not subside for some eighteen hours afterwards. I was at once sent for and discovered that complete hemiplegia of the left side had occurred, including the face and tongue. She was entirely conscious, and yet seemed slightly "dazed" or stupid; endeavored to talk but could not; great difficulty in articulation, but no aphasia; the effort to do so seemed apparently so ridiculous when she found she could not, that she tried to laugh, and this being unsuccessful it caused her to cry.

I will again, in passing state that her cheerfulness and liveliness of disposition was a marked feature during her entire illness; there was a slight dilatation of the left pupil, but the iris was perfectly sensitive to light; a numbness and coldness of both extremities—left side; temperature not taken; pulse 100; such were the only symptoms observed at the time.

Within a very few hours, the slight dullness or cloudiness of intellect had passed away, and neither at the time of this attack, nor at *any* time during the whole period of her illness (excepting the few hours before her death) was there any impairment of the mental faculties. The facial paralysis and difficulty in articulation completely disappeared during the first twenty-four hours. On the evening of the fourth day, she was removed to her own home, and for the next five weeks the treatment consisted in the administration of Vallets mass, grs. xx., a bottle of good porter, and at least a ¼lb. of animal food daily; the result was, her general health became exceedingly good in all respects.

The necessity for artificial warmth subsided within the first ten days after the attack; in fact, it *never was* required, except in the left limb, below the knee. After the third week, involuntary contractions or movements took place frequently in the left foot, not above the ankle, pain being felt in the joint at such times. Twice after the fourth week, the *left upper extremity* was *involuntarily* raised from her side at night during sleep, and *placed over her head.*

Friction of left shoulder caused pain, and pain of severe character was experienced occasionally at different parts of the left leg and arm. No friction was employed until about the middle of October.

On the evening of October 28th, she was suddenly seized with *very* severe pain in the *right* arm, a little above the wrist-joint (radial artery); this was soon followed by a sensation of numbness and coldness of the right hand, the pulse lost at that point, but no loss of motion.

The next morning all pain had ceased, the pulse at both wrists was the same, and within forty-eight hours all abnormal sensations had vanished. For the first two weeks the pulse ranged between 56 and 70; after this period, between 70 and 80; the temperature at all times, normal.

Nov. 9th. Began the use, hypodermically, of strychnia sulph. gr. 1-48 once daily.

Nov. 10th. The faradic current employed once a day, the muscles of both left extremities responded more or less promptly.

Nov. 20th. Substituted the elixir of Calisaya, containing quinine and pyro-phosphate of iron for the pills of Vallets mass; all the organic functions seem perfectly normal, no improvement whatever in the paralysis.

Nov. 24th. Strychnia increased to gr. 1-32, once daily.

Nov. 25th. Commenced the "movement cure," as conducted by Dr. C. F. Taylor, once a day. Within the past ten days the patient has suffered from severe pains in the region of the spleen, heart and lower right chest, but neither in the head nor extremities, although occasionally head-ache; full doses of morphia and chloral were found to be absolutely necessary.

Just at this time there was loss of appetite, constipation, sleeplessness; the elixir was changed to bitter wine of iron; no improvement in the paralysis; carbonate of ammonia, 10 grains daily, was now suggested, in order to dissolve or prevent further formation of blood or fibrinous clots, according to the views of Dr. Richardson, of London; but as it was feared it might create gastric disturbance without being beneficial, it was never administered.

Up to Dec. 1st, the case had been seen by Drs. Loomis, Polk, Hammond, S. W. Roof, S. B. Ward, and R. Taylor.

Dec. 2d. Dr. A. D. Rockwell was invited in consultation, and advised "central faradization," in conjunction with the above-mentioned current, to be employed very mildly, not specially selecting the "motor points" for the purpose of producing contractions, but merely for the beneficial effect of a gentle current through the muscles and other tissues.

Dec. 4th. The patient was sitting upon the edge of the bed, when I requested her to stand up if possible, unsupported; before attempting to do so, the left leg *below the knee*, was *involuntarily* extended.

Being both surprised and pleased at this, she discovered, upon *trying* to do so immediately, that she could *voluntarily* extend the leg, she did so several times, until it caused pain. As just requested, she now stood upon both feet, bore her weight upon that side, and by being partially supported, walked a few steps, the *first* and *only* successful attempt since the occurrence of the hemiplegia, two months previously. She had noticed during the day that the whole lower extremity

felt much more natural, especially when the foot was placed upon the floor.

This took place immediately following the use of the battery.

Dec. 18*th.* The loss of appetite still continuing, "Horsford's Acid Phosphate," a teaspoonful before meals, has been administered for the past few days, with but slight benefit; constipation more or less troublesome.

Strychnia has not been given in any form for the past week, as it produced severe local irritation hypodermically, and an interval of non-employment entirely was considered advisable.

Dec. 19*th.* Since the 4th instant, the condition of left lower extremity has gradually improved; the patient bearing more weight upon it, walking more steadily, but not without assistance; complains every few days of sharp pain in the splenic region, as also lately in the *right* ankle-joint, these pains always subsiding in an hour or so; use of electricity being continued as indicated Dec. 2d.

December 20*th.* Strychnia resumed, gr. 1-32, internally.

January 10*th*, 1875. An obscure symptom or phenomenon of this most interesting case, occurred this evening. The patient suddenly (while endeavoring to do so), *voluntarily* moved, raised overhead, flexed, and extended, the left (paralyzed) fingers, hand, lower and upper arm. This she did when requested, and sufficiently often, to convince all present of its being *voluntarily* done; but the muscles becoming wearied, she soon ceased, and was *never afterwards* able to do so again.

January 23*d.* Began employment of the galvanic current; the top of the head being first moistened with salt water, the positive pole was first applied there for five minutes, then over the 6th cervical vertebra for the same length of time; the negative pole in the meantime being placed upon the epigastrium only. The faradic current administered but every other day now.

January 31*st.* With the exception of accidental intervals of a day or so, the strychnia has been continuously given internally since December 20th, and gradually increased during this month from gr. 1-32 once daily. to gr. 1-16 twice daily, without perceptible benefit.

It was now decided to administer it in rapidly increasing doses, until constitutional effects were manifested, the following being a very convenient prescription for this purpose: ℞. strychniae sulph., grs. iii, aquae dest. ʒi. M., S., 10 drops three times a day, increasing one drop at each dose daily, untill twitching or stiffness of the muscles of the calf, and nape of the neck were produced. Has been taking the bitter wine of iron constantly ever since commencing it.

Her appetite and general condition were now very good, varying slightly every few days; the mental faculties sound, undisturbed, spirits bright, hemiplegia just the same.

During this month (January), she suffered from two *very* severe attacks of dyspnœa, palpitation, cardiac pain and distress, and during the same, loud, moist rales could be distinctly heard upon auscultation of the chest.

Nothing was prescribed at these times, as the semi-recumbent position and absolute quiet occasioned their subsidence.

A prescription, which afforded much relief during previous similar attacks, is the following: ℞. tinct. valerian ʒss., tinct. digitalis ʒi, spts. lavand. co., spts. etheris co. aa. ʒss; M. S. A teaspoonful when necessary.

February 3d. This A. M. I found the patient standing by the wash-basin, holding on to it with her right hand (she never could use her left), gazing upon the floor with a vacant fixed look, and swaying to and fro as a person intoxicated. Asking her "what was the matter," she made no reply, did not notice me at all.

I hastily lifted her into bed, when she began to cry and sob bitterly; in doing so, the face was drawn entirely to the left side, this being *the only facial paralysis observed since the first day of her illness.*

She stated afterwards that she was unconscious of everything when standing by the wash-basin. She remained in bed all that day, perfectly conscious, but never speaking unless spoken to; had more or less headache, and sharp pain about the middle lobe of right lung.

These symptoms passed off toward that evening, and did not again return.

From the time of this peculiar state of unconsciousness un-

til her death, nineteen days afterwards, it was ever my impression that she was not the same person mentally, intellectually "not herself at all;" others could not observe that this was the case.

She seemed much more reserved, quiet, reticent, yet not irritable; when talking (although perfectly sensible), she hesitated—considered apparently what she was about to say.

February 5th. A spasmodic, tonic contraction of the extensor muscles of left leg and foot took place, the heel being elevated, only the toe touching the floor, accompanied by a stiffening sensation of the muscles at nape.

These symptoms subsided in a few minutes, and there was no recurrence of the same until February 13th.

They were naturally enough attributed to the strychnia, of which she was then taking fourteen drops three times daily, of the prescription above-mentioned, although at the same time I felt convinced that there was some brain lesion present (softening, for instance) other than the embolus alone.

The administration of the strychnia was temporarily suspended, as was also the galvanic current; the faradic was still continuously employed, one-half hour every other day. The electro-muscular sensibility of both lower extremities about equal, the left arm less sensitive than the right.

February 9th. Strychnia resumed, ten drops three times daily, as also the galvanic current for but a few minutes once daily.

The "Swedish-movement-cure" manipulations were again begun at this date, having been discontinued for the previous three weeks; operator to call twice weekly; the porter and wine of iron still continued.

February 13th. Since last note, (February 9th) tonic contractions of extensor muscles, left leg and foot became quite frequent, usually when attempting to walk.

As the strychnia had not been given in excessive doses, it was discontinued entirely for four days, the contractions occurring notwithstanding. (Could they not have been dependent upon cerebral irritation at the point of softening?)

The patient becoming exceedingly weary of the house, to which she had been so long confined, with a great desire "to

have a ride," and the weather being very pleasant, she was very carefully driven to Brooklyn, to visit an intimate friend for a few days, all treatment being suspended except the iron and porter.

February 15th. She returned to her home cheerful and bright, apparently much benefited by the trip, but suffered severely while there from vesical irritation; incontinence, with great frequency of micturition and ardor urinae; pulse and temperature normal; had taken a mixture of belladonna, hyoscyamus, and sweet spirits of nitre, together with hot fomentations to hypogastrium, with some benefit. Spasms of extensors above referred to, had occurred once while absent.

February 18th. Return of vesical irritability more severely than before; no pain, uneasiness, nor retention; ardor urinae always *after* urination; no spasm apparently of the sphincter vesicae; a pill of belladonna and conium given every four hours, with citrate of potash half-a-drachm every two hours; flax seed tea *ad libitum*.

At various times during her illness, the urine was examined chemically and microscopically, with negative results, excepting the presence occasionally of crystals of the stellar phosphate of lime.

The strychnia was discontinued at the time of her visit to Brooklyn, and was never again resumed.

After her return the galvanic current was again employed daily, the faradic every other day; iron and porter, as usual. This patient died on February 22d, at 3 o'clock, A. M., the peculiar, sad, painful termination of her illness being as follows:

Feb. 20th, Saturday; she had risen and breakfasted as usual; was in "good spirits," the vesical irritability having almost entirely passed away.

About 11 o'clock A. M. she was standing by the mantel-piece, no one in the room except her little niece, who noticed that she was leaning over and forward in a very strange manner, as if about to fall. Assisting her with great difficulty to the bedside, the patient began to cry in a loud and distressing manner, but shortly becoming more composed, she complained of a *very* acute, sharp pain in the *left* temporal region, as also of

pains in the upper portion of the body at different points. The crying was soon *again* renewed as before, and vomiting of the ordinary contents of the stomach occurred once. While now lying down, the crying continuing, the mouth and cheek were drawn sharply to the *left* side, the lower jaw held firmly and widely open, she endeavoring all the time to close it, as if she feared its disarticulation. Asking her if she felt easier when trying to elevate it, she with great effort answered "yes." Assisting her to do so, I found a condition of fixed, tonic contraction. She could not protrude the tongue beyond the lower teeth; it seemed "tongue-tied." The *consciousness* of her condition agitated her exceedingly, and her cries and sobs were agonizing to hear. Three times she raised herself from the pillow, was quiet for a few moments, then again screaming fell back with facial, as also with clonic contractions and tremors of all the extremities. Pulse 200, respiration 30. Dr. Polk arriving, at once employed hypodermically ten drops of tinct. digitalis, which quieted the heart very much within five minutes. Again lying back quietly, we left her for a moment, with her older sister, to consult in an adjoining room, but were immediately recalled, and found her in a semi-unconscious state. The jaws were tightly closed upon the tip of her tongue; the eyes fixed and staring, without strabismus; the face and forehead becoming rapidly swollen, assuming a reddish, livid hue, as seen in apoplexy; all the extremities were extended, with their muscles firm and rigid; the fingers of the left hand tightly *flexed*, with the palm turned *outwards;* the left foot strongly *extended*, with the sole turned *inwards.* Another injection of digitalis, same quantity, was given, and an enema of turpentine and hot water ordered, which, however, she never received, as, during its preparation, she became worse so rapidly it was deemed useless. Cold applications were made to the head; mustard poultices and bottles of hot water to the lower extremities, which were now cold; pulse 180, respiration 30, stertorous and labored; slight frothing at the mouth; jaws still closed; coma deepening.

She was *somewhat* conscious until about 4 P. M. next day, Sunday, Feb. 21st, *but absolutely speechless and motionless,* with the exception of the eyes; the lids were opened and

closed; the eye-balls moved and rolled naturally when looking at any one directly in front of her; the expression of the eyes intelligent but painfully anxious. Once upon Saturday afternoon, when her dear lady friend from Brooklyn stood before her, tears were seen to flow, and an effort made to cry, but only momentarily. With her head constantly inclined to the right side there was not the slightest movement, voluntarily, of any portion of the body; slight tremors and contractions taking place when her face was bathed, or hands grasped, especially the left. Voluntary deglutition was totally abolished; involuntarily, however, from purely reflex action occasioned by its presence when much had accumulated in the pharynx, and many attempts had been made, saliva would be swallowed.

The jaws remained firmly closed until 2 A. M. Sunday, 21st, after which time she breathed with the mouth open; the tongue fell far backward, and became very dry. From this time she was seemingly comfortable, the coma having gradually become more profound. The pulse ranged between 130 and 150, the respiration from 24 to 30, until about noon of Sunday, when the character of the respiration changed, consisting of a loud, sudden, jerking inspiration, followed by *two* short expirations, the second much the longest.

Towards 3 p. m. (Sunday) the expression and appearance of the features and face became gradually more ghastly and death-like, the respiration less frequent and labored. After 10 p. m. the eye-balls were rolled upwards, the cheeks much sunken, mouth open, pulse 130—death closing the scene and releasing the sufferer at 3 a. m., Feb. 22d, 1875.

The treatment during the last two days consisted in the occasional hypodermic injection of tinct. digitalis, as also brandy, and Magendies solution of morphia; enemata of beef tea alternating with sweet oil.

On Sunday, Feb. 21st, a blister was applied to the back of the neck, which "drew" well, without other effect; also two drops of croton oil given, which failed to act. In fact any other or further treatment was considered useless and unnecessary.

POST-MORTEM.

The post-mortem was held 36 hours after death, in the presence of Drs. Hammond, Polk, Rockwell, Roof, R. Taylor and myself, Dr. T. M. B. Cross conducting it. Rigor mortis well marked. The brain alone was examined. The right middle cerebral artery was found to be occluded by a firm, hard, whitish or transparent fibrinous clot, about the size of a grain of wheat; the right corpus striatum was completely broken down, softened, disorganized. All other portions of the brain were in a perfectly normal condition as far as could be ascertained at that time. Both the *right* and left optic thalami, left corpus striatum, pons, medulla, ventricles, cerebellum and lobes of the cerebrum were examined. No hemorrhage, serous effusion, nor other emboli were found in any portion of the encephalon.

REMARKS.

Just before the post-mortem was held there were several opinions expressed as to the special lesion causing death. As before mentioned, the symptoms (of final attack) much resembled those of cerebral apoplexy, and I believe it was generally considered that hemorrhage into the softened portion had taken place, as also at the base of the brain; involving probably the pons varolii, owing to the difficult, interrupted respiration, loss of power of deglutition, rapidly fatal termination, the copious sweating of head and face, although the pupils were not abnormally contracted. As evidenced by the post-mortem, however, this was not the case. Again, there are cases on record where such hemorrhage *has* occurred, years before death, without such symptoms being present as are laid down by Niemeyer, and concurred in by Reynolds. One physician present much doubted the existence of any extravasation, but felt convinced that death ensued from the further lodgement of one or more emboli into larger arteries, probably a vessel supplying chiefly the pons. As before said, this was not proven to have been the case at the post-mortem.

Among many others the above case presents the following interesting features:

I. No loss of consciousness. This may or may not occur in cerebral embolism, and is considered at the present time as

a symptom scarcely to be entertained in a diagnostic point of view.

II. Dull, heavy pain in the right temporal region—the side on which the embolus was lodged.

III. Emotional condition of the patient. This condition is frequently observed in affections of the right hemisphere.

IV. Involuntary movements of the paralyzed side. These movements *not* being associated with movements of the healthy side, must be considered as the so-called "automatic movements" observed as occurring in cerebral hemorrhage and other cerebral affections.

V. Embolism of the right radial artery.

VI. Sharp pain in splenic region, subsiding in an hour or two, and probably due to embolism of the spleen.

VII. On Feb. 3d, 5th, 9th and 20th, spasmodic movements were of frequent occurrence.

VIII. On Feb. 3d, there was "drawing" of the face, to the left side, for a few moments, and after this attack, marked hesitation of speech, the face resuming its previous appearance.

IX. On Feb. 5th, spasm of the paralyzed limbs, which subsided in a few moments; but from this time on recurring frequently, when the patient attempted to walk. Condition of the face not noticed.

X. On Feb. 20th, severe pain in the left temporal region—vomited once—mouth and cheek drawn to left side, inability to protrude the tongue, general clonic convulsions, followed by general tonic spasm and death.

In explanation of the above, we know that spasmodic movements are apt to take place in affections of the cortex, pons varolii, and the white substance of the right hemisphere, just outside the opto-striate body. It is very probable, then, that the spasmodic movements of the face, on Feb. 3d, and of the limbs on Feb. 5th, were due to embolism of certain vessels supplying the cortex; and that the clonic and tonic convulsions, that ushered in death, were the result of multiple embolisms. The absence of points of softening does not militate against this view; since softening could not be established from the time of this attack (Feb. 20th), until her death, two days after-

wards. Again, the emboli could only be discovered after much time and labor, which was not given.

This same explanation may be offered for the attacks of Feb. 3d and 5th, at which times the spasmodic movements were more circumscribed; and, if softening *did* occur after these attacks, it was probably overlooked, or collateral circulation was established; that is, if we adopt the views of Heubner, who believes the anastomoses of vessels of the pia mater supplying the cortex, to be very free, as opposed to the vessels supplying the basal ganglia.

We may mention, *en passant*, that the researches of Duret controvert this; as he has shown that the arteries of the cortex, like those of the base, do not anastomose, and are terminal.

In explanation of the spasmodic movements in walking, the strychnia, and the site of the softened patch in the right hemisphere are probably sufficient. Finally, we will only add, that for such cases as these, there is no relief, no cure; for, owing to the anatomical distribution of these vessels (at base of the brain), being terminal, without anastomoses, recovery is impossible; there can be no collateral circulation established.

12 E. 28th STREET, NEW YORK.

ART. VI.—EXPERIMENTAL AND CLINICAL INVESTIGATIONS ON CERVICAL PARAPLEGIA.

BY PROF. DR. M. ROSENTHAL.

[*Translated from Stricker's Jahrbuecher, IV.* 1876, *pp.* 381–400 *incl. by Dr. J. I. Tucker.*]

While typical paraplegia of the lower extremities has long been a common subject of medical observation, as much cannot be said of that rarer paraplegic affection, having its seat in the upper limbs, and designated by Gull,* as cervical para-

**Guy's Hosp. Rep.*, IV. 185.